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#### **ABSTRACT**

This document presents results of job profiling . workshops conducted as part of the Ohio Vocational Competency Assessment (OVCA) program. The first section describes how representatives of business, industry, labor, and community organizations identified academic skill levels needed by entry-level workers in the occupational areas covered by the Occupational Competency Analysis Profiles (OCAPs). It discusses the two assessment components of the OVCA package: the OCAP, which assesses students' occupational skills, and Work Keys, which measure students' applied academic skills. The second section describes the skills needed to achieve each level for each of the seven Work Keys academic skills: applied mathematics, locating information, reading for information, applied technology, listening, writing, and teamwork. The third section provides results of the 1994-1995 job profiling for 39 occupations. For every occupational area, shaded graphs represent each Work Keys academic skill. Each graph shows the range of levels for that particular skill; the shading represents the academic skill level required by an entry-level worker in that occupation, as determined by the job profiling committee. A job profiling results summary chart is provided. (YLB)

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# Job Profiling Guide

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Results of 1995 Job Profiling
Part of the Ohio Vocational
Competency Assessment
(OVCA) Package



OHIO
VOCATIONAL
COMPETENCY
ASSESSMENT

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A Support System for Credentialling
Ohio's Skilled Workforce



# Job Profiling Guide

**Results of 1995 Job Profiling** 

Vocational Instructional Materials Laboratory

Columbus, Ohio



The Vocational Instructional Materials Laboratory, The Ohio State University, 1900 Kenny Road, Columbus, Ohio 43210

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### The Purpose of Job Profiling

Developed by American College Testing (ACT), the purpose of the Job Profiling process is to identify the **level** of applied academic skills that, according to business and industry, students must master to qualify for and be successful in their occupation of choice. The results of Job Profile "leveling" can help teachers to better target instruction toward their students' needs.

As part of the Ohio Vocational Competency Assessment (OVCA) program, the Vocational Instructional Materials Laboratory (VIML) at The Ohio State University has conducted Job Profiling workshops in which representatives of business, industry, labor, and community organizations identified the academic skill levels needed by entry-level workers in the occupational areas covered by the Occupational Competency Analysis Profiles (OCAPs). The Job Profiling, which was carried out in fall 1994 and spring 1995, was sponsored by the Ohio Department of Education, Division of Vocational and Adult Education.

#### OVCA-What Is It?

The Ohio Vocational Competency Assessment (or OVCA) package consists of two assessment components: OCAP and Work Keys. Together they measure entry-level occupational, academic, and employability skills. All OVCA items are criterion-referenced, use a multiple-choice format, and are administered using a traditional paper-and-pencil method. The OVCA is designed to do the following:

- Provide one dimension of a multi-assessment strategy for career passport credentialing
- Evaluate learner readiness for jobs requiring specific occupational, academic, and employability skills
- Assist educators in curriculum development
- Provide state-aggregated learning gain scores to comply with regulations in the Carl D.
   Perkins Vocational and Applied Technology Act of 1992

OCAP. The OCAP component of OVCA assesses students in occupational skills—employment requirements—in a particular occupational area. Assessment is based on the core competencies identified through the OCAP process, and each multiple-choice assessment item is correlated to those essential competencies.



Work Keys. The Work Keys component, developed by ACT, measures students' applied academic skills. All OVCA packages contain two Work Keys assessments:

- Applied Mathematics measures students' ability to analyze, set up, and solve math problems typically found in the workplace.
- Locating Information measures students' ability to use graphic documents to insert, extract, and apply information.

In addition, certain taxonomies will use the following Work Keys assessments:

- Reading for Information will be used by Business, Marketing, Home Economics, Health Education, and Cosmetology taxonomies.
- Applied Technology will be used by Trade and Industrial and Agricultural Education taxonomies.

Other optional Work Keys assessments, not included in the basic OVCA package, are *Teamwork, Listening*, and *Writing*.

Each Work Keys assessment is further broken down into four to five levels of achievement, with higher numbers indicating higher achievement in the assessed skill (descriptions of the levels for each Work Keys assessment are provided on pages 3-9). For each academic skill, the Job Profiling process identifies the level required for successful entry into an occupational area.

#### Job Profiling—How It Works

VIML's Job Profiling process was initiated by mailing surveys to current workers in OCAP occupations all across Ohio. The survey's purpose: to have actual workers in specific occupations rate job tasks according to each task's frequency and criticality—that is, the amount of time spent performing each task relative to other tasks and the importance of each task to overall job performance.

To complete the survey, participants examined OCAP competencies for their occupation. Based on the survey's results, VIML staff produced a list of the most critical competencies in each occupation.

The next stage of Job Profiling was to convene committees of subject-matter experts to perform "leveling," which involved the following tasks:

- Examining the frequency and criticality competency lists for an occupation
- Reviewing the levels associated with each of the seven Work Keys academic skills: Locating Information, Reading for Information, Applied Mathematics, Applied Technology, Listening, Writing, and Teamwork
- Identifying the level of skill students must master relative to each Work Keys academic skill in order to successfully perform the occupational competencies

Finally, in 1995, the initial leveling of Work Keys academic skills for the occupational areas were revalidated by a new panel of expert workers convened to update the OCAPs.



### Levels of Work Keys Defined

This section describes the skills needed to achieve each level for each Work Keys academic skill.

#### **Applied Mathematics**

Applied Mathematics measures skill in applying mathematical reasoning to work-related problems. There are five levels of complexity, 3 through 7, with Level 3 being the least complex and Level 7 being the most complex. The levels build on each other, each incorporating the skills at the preceding levels.

#### Level 3

- Perform basic mathematical operations (addition, subtraction, multiplication, and division) and conversions from one form to another, using whole numbers, fractions, decimals, or percentages.
- · Translate simple verbal problems into mathematical equations.
- Directly apply logical information provided to solve problems, including those with measurements and dollars and cents.

#### Level 4

- Perform one or two mathematical operations (such as addition, subtraction, or multiplication)
  on several positive or negative numbers. (Division of negative numbers is not covered
  until Level 5.)
- Add commonly known fractions, decimals, or percentages (e.g., 1/2, .75, 25%) or add three fractions that share a common denominator.
- Calculate averages, simple ratios, proportions, and rates, using whole numbers and decimals.
- Reorder verbal information before performing calculations.
- Read simple charts or graphs to obtain information needed to solve a problem.

#### Level 5

- Look up and calculate single-step conversions within English or non-English measurement systems (e.g., converting ounces to pounds or centimeters to meters) or between measurement systems (e.g., converting centimeters to inches).
- Make calculations using mixed units (e.g., hours and minutes).
- Determine what information, calculations, and unit conversions are needed to find a solution.



3

#### Level 6

- Calculate using negative numbers, fractions, ratios, percentages, mixed numbers, and formulas.
- Identify and correct errors in calculations.
- Translate complex verbal problems into mathematical expressions, using considerable setup and multiple-step calculations or conversions.

#### Level 7

- · Solve problems requiring multiple steps of logic and calculation.
- Solve problems involving more than one unknown, nonlinear functions (e.g., rate of change), and applications of basic statistical concepts (e.g., error of measurement).
- Locate errors in multiple-step calculations.
- Solve problems with unusual content or format, or with incomplete or implicit information.

#### **Locating Information**

Locating Information measures skill in using information taken from workplace graphics such as diagrams, blueprints, floor plans, tables, forms, graphs, charts, and instrument gauges. There are four levels of complexity, 3 through 6, with Level 3 being the least complex and Level 6 being the most complex. The levels build on each other, each incorporating the skills at the preceding levels.

#### Level 3

- Find one or two pieces of information in elementary workplace graphics, such as simple order forms, bar graphs, tables, flowcharts, and floor plans.
- Fill in one or two pieces of information that are missing from elementary workplace graphics.

#### Level 4

- Find several pieces of information in straightforward workplace graphics, such as basic order forms, line graphs, tables, instrument gauges, maps, flowcharts, and diagrams.
- · Summarize and/or compare information and trends in a single straightforward graphic.
- Summarize and/or compare information and trends among more than one straightforward workplace graphic, such as a bar chart and a data table showing related information.

#### Level 5

- Summarize and/or compare information and trends in single complicated workplace graphics, such as detailed forms, tables, graphs, maps, instrument gauges, and diagrams.
- Summarize and/or compare information and trends among more than one complicated workplace graphic, such as a bar chart and a data table showing related information.

#### Level 6

 Make decisions, draw conclusions, and/or apply information to new situations using several related and complex workplace graphics that contain a great amount of information or have challenging presentations (e.g., very detailed graphs, charts, tables, forms, maps, blueprints, diagrams).



#### Reading for Information

Reading for Information measures skill in reading and understanding work-related reading materials. There are five levels of complexity, 3 through 7, with Level 3 being the least complex and Level 7 being the most complex. Although Level 3 is the least complex, it still represents a level of reading skill well above "no skill at all." The levels build on each other, each incorporating the skills at the preceding levels.

#### Level 3

- Identify uncomplicated key concepts and simple details.
- Recognize the proper placement of a step in a sequence of events, or the proper time to perform a task.
- · Identify the meaning of words that are defined within a passage.
- · Identify the meaning of simple words that are not defined within a passage.
- Recognize the application of instructions from a passage to situations that are described in the passage.

#### Level 4

- · Identify details that are more subtle than those in Level 3.
- Recognize the application of more complex instructions, some of which involve several steps, to described situations.
- · Recognize cause-effect relationships.

#### Level 5

- Identify the paraphrased definition of jargon or technical terms that are defined in a passage and recognize the application of jargon or technical terms to stated situations.
- Recognize the definition of acronyms that are defined in a passage.
- Identify the appropriate definition of words with multiple meanings.
- Recognize the application of instructions from a passage to new situations that are similar to the situations described in the reading materials.
- Recognize the applications of more complex instructions to described situations, including conditionals and procedures with multiple steps.

#### Level 6

- Recognize the application of jargon or technical terms to new situations.
- Recognize the application of complex instructions to new situations.
- Recognize the less-common meaning of a word with multiple meanings from context.
- Generalize from a passage to situations not described in the passage.
- · Identify implied details.
- Explain the rationale behind a procedure, policy, or communication.
- Generalize from a passage to a somewhat similar situation.



#### Level 7

- Recognize the definitions of difficult, uncommon jargon or technical terms from context.
- Generalize from a passage to situations neither described in nor completely similar to those in a passage

#### **Applied Technology**

Applied Technology measures skill in solving problems of a technological nature, involving the basic principles of mechanics, electricity, fluid dynamics, and thermodynamics as they apply to machines and equipment found in the workplace. There are four levels of complexity, 3 through 6, with Level 3 being the least complex and Level 6 being the most complex. Although Level 3 is the least complex, it still represents a level of applied technology skill well above no skill at all. The levels build on each other, each incorporating the skills at the preceding levels.

#### Level 3

- Apply the elementary physical principles underlying the operation of uncomplicated systems or tools.
- Recognize and identify relevant aspects of simple problems that involve one uncomplicated system or tool.
- · Select appropriate methods or materials needed to solve problems.

#### Level 4

- Recognize, identify, and order relevant aspects of one moderately complex system or more than one uncomplicated system.
- Evaluate alternative solutions to determine the most appropriate one for the situation presented.

#### Level 5

- Solve problems based on one complex system, or one or more uncomplicated tools or systems.
- Understand and apply moderately difficult principles of mechanics, electricity, thermodynamics, and fluid dynamics, in addition to understanding complex machines and systems.
- Recognize, identify, and order relevant aspects of a problem before reaching an appropriate solution.

#### Level 6

- Solve problems that do not contain all the information needed to solve them, and/or in which the information provided may be out of logical order.
- Solve problems that contain extraneous information.
- Solve problems involving one or more tools or systems having a wide range of complexity.
- Apply difficult physical principles.
- Understand and correctly interpret the interaction of several complex systems.



#### Listening

Listening measures skill at listening to and understanding work-related messages, receiving information from customers, coworkers, or suppliers, and then writing down the information to communicate it to someone else. Students demonstrate their ability to distinguish and communicate critical information and noncritical information. Critical Information consists of those details which the message's recipient must have to understand the message and act upon it (e.g., names, phone numbers, addresses, times). Noncritical Information can improve a message by providing details that further explain the message or its tone, but the absence of this noncritical information does not interfere with the recipient's ability to understand and accurately act upon the message. Each Listening level describes the content and quality of messages students write to describe an audio message.

Each *Listening* level describes the content and quality of students' written messages that describe an audio message.

#### Level 0

No meaningful information, or totally inaccurate information.

#### Level 1

Minimal pertinent information; enough context to provide clues as to gist of situation or source of further information.

#### Level 2

Some pertinent information; may have incorrect critical information, but sketch of the situation is correct.

#### Level 3

All the critical information that is present is correct; may be missing a few pieces of critical information.

#### Level 4

All critical information is given and is correct; may be missing subtle details or tone; may have incorrect noncritical information that does not interfere with central meaning.

#### Level 5

All critical information is present and correct; response conveys insight into situation through tone and/or subtle details.



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#### Writing

Writing measures skill at writing work-related messages, receiving information from customers, coworkers, or suppliers, and then writing down the information to communicate it to someone else. Each Writing level rates the writing mechanics (such as sentence structure and grammar) and writing style of students' written messages that describe an audio message.

#### Level 0

An attempt is made at the message, but the message is completely garbled with no recognizable sentence structure.

#### Level 1

Message conveyed inadequately; overall lack of proper sentence structure.

#### Level 2

Message conveyed inadequately; weak sentence structure; large number of mechanical errors.

#### Level 3

Message conveyed clearly; most sentences complete; some mechanical errors.

#### Level 4

Message conveyed clearly; all sentences are complete; may have a few minor mechanical errors; may have a choppy style.

#### Level 5

Message conveyed clearly; good sentence structure; no mechanical errors; highly appropriate for business setting and situation; smooth, logical style.

#### Teamwork

Teamwork measures skill in choosing behaviors and/or actions that simultaneously support team interrelationships and lead toward the accomplishment of work tasks. There are four levels of complexity, 3 through 6, with Level 3 being the least complex and Level 6 being the most complex. Although Level 3 is the least complex, it still represents a level of teamwork skill well above no skill at all. The levels build on each other, each incorporating the skills at the preceding levels.

#### Level 3

- · Identify team goals and ways to work with other team members to accomplish those goals.
- Choose actions that support the ideas of other team members to accomplish team goals.
- Recognize that a team is having problems finishing a task and identify the cause of those problems.



#### Level 4

- Identify the organization of tasks and the time schedule that would help accomplish team goals efficiently and effectively.
- Select approaches that accept direction from other team members in order to accomplish tasks and to build and keep up good team relations.
- Identify behaviors that show appreciation for the personal and professional qualities of other team members and respect for their diversity.

#### Level 5

- · Identify courses of action that give direction to other team members effectively.
- Choose approaches that encourage and support the efforts of other team members to further team relationships and/or task accomplishment.
- Consider the possible effects of alternative behaviors on both team relationships and team accomplishments and select the one that would best help the team meet its goals.

#### Level 6

- Identify the focus of team activity and select a new focus if that would help the team meet its goals more effectively.
- Select approaches that show the willingness to give and take direction as needed to further team goals (e.g., recognize the organization of team members' tasks that would best serve the larger goals of the team).
- Choose approaches that encourage a team to act as a unit and reach agreement when discussing specific issues.
- Identify actions that would help manage differences of opinion among team members, moving the team toward its goals while valuing and supporting individual diversity.



### Results of 1994/1995 Job Profiling

### **Example of Job Profiling**

For every occupational area, there are shaded graphs to represent each of the seven Work Keys academic skills. Each graph shows the range of levels for that particular skill; the shading represents the academic skill level required by an entry-level worker in that occupation, as determined by the Job Profiling committee. For example:

### Applied Mathematics

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In the graph shown, *Applied Mathematics* has a skill range of 3-7. The required skill level, determined by Job Profiling and shown by the shading, is 6.

Following these graphics is a summary chart of the Job Profiling results for all 39 occupations.



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### Applied Mathematics

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### Agricultural/Industrial Mechanical Technician

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#### **Teamwork**

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### **Agricultural Production**

### Applied Mathematics

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### **Auto Collision Technician**

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# Job Profiling Results Summary Chart

Work Keys Assessment and Skill Range	Applied Mathematics	Locating Information	Reading for information	Applied Technology	Listening	Writing	Teamwork
Occupation	3–7	3–6	3–7	3-6	1-5	1-5	3-6
Accounting	6	5	6	NA	5	5	4
Administrative/Office Technology	6	5	6	4	5	4	5
Agricultural/industrial Mechanical Technician	5	5	6	5	4	3	4
Agricultural Production	4 .	4	4	5	4	2	4
Agricultural Products Processing	6	5	5	5	4	4	5
Agricultural Sales and Service	4	5	4	4	4	4	4
Auto Collision Technician	6	5	6	5	5	3	6
Auto Mechanics	6	5	7	5	5	4	4
Building and Property Maintenance	5	4	3	4	4	3	4 ·
Business Administration and Management	6	5	5	4	5	4	4
Business information Systems	6	5	. 6	4	5	4	4
Carpentry	5	4	4	4	3	3	6
Commercial Art	5	5	6	4	4	4	4
Commercial Photography	5	4	5	4	3	3	3
Criminal Justice	3	4	5 ,	3	4	4	4
Dental Assistant	5	4	5	4	5	5	6
Diesel Mechanics	6	5.	6	6	5	5	5
Drafting	6	5	5	4	3	4	3
Early Childhood Education and Care	4	3	4	3	4	4	4



Work Keys Assessment and Skill Range	Applied Mathematics	Locating Information	Reading for Information	Appiled Technology	Listening	Writing	Tesmwork
Occupation	3-7	3-6	3-7	3-6	1-5	1-5	3-6
Electrical Trades	5	4	4	3	3	2	3
Electronics	6	5	6	5	4	4	5
Entertainment Marketing	5	5	6	5	5	5	6
Environmental Management	6	5	5	4	5	4	4
Food Management, Production, and Services	5	4	3	3	4	2	4
General Marketing	5	5	5	3	5	3	4
Graphic Communications	6	4	5	4	4	4	4
Heating, Ventilation, Air-Conditioning, and Refrigeration	6	5	5	5	4	3	3
Horticulture	5	4	4	,3	5	4	3
Hospitality and Facility Care Services	3	4	3	3	4	3	6
industrial Maintenance	6	- 5	6	6	4	4	4
Marketing Management	6	5	5	4	5	5	4
Masonry	4	4	3	4	4	3	4
Medical Assistant	5	4	5	3	5	4	5
Natural Resources	5	4	4	4	4	4	4
Nurse Alde	3	4	4	3	4	3	5
Power Equipment Technology	5	5	5	6	5	3	4
Precision Machine Technologies	7	5	5	5	4	4	3
Travel and Tourism Marketing	5	5	5	4	5	5	4
Welding	6	4	. 4	4	4	4	3



# **Job Profiling Participants**

The Vocational Instructional Materials Laboratory wishes to extend thanks and appreciation to the many representatives of business, industry, labor, and community organizations who donated their time and expertise to ensure the success of Job Profiling.

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